IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Mohammed N. Islam
Serial No.:	10/005,998
Filing Date:	December 3, 2001
Group Art Unit:	2633
Examiner:	Shi K. Li
Confirmation No.:	2944
Title:	Method and Apparatus for Scheduling Communication Using a Star Switching Fabric

Mail Stop Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Sir:

RESPONSE TO EXAMINER'S INTERVIEW SUMMARY

In response to Examiner's Interview Summary and Notice of Allowance mailed June 26, 2006, Applicants provide the following response.

IN THE CLAIMS

For the convenience of the Examiner, all pending claims of the present Application are shown below.

1. (Previously Presented) A scheduler for use with a star switching fabric, the scheduler comprising:

a scheduling star switching fabric operable to receive a plurality of packets each associated with one of a plurality of wavelengths;

a plurality of selecting elements associated with the scheduling star switching fabric, each operable to contribute to selectively passing packets from the scheduling star switching fabric for receipt by a transmission star switching fabric, wherein packets received at the transmission star switching fabric over a given time period comprise a more uniform load distribution than packets received at an input to the scheduler over the same period of time; and

an intermediate buffer stage residing between the scheduling star switching fabric and the transmission star switching fabric, the intermediate buffer stage operable to store packets received by the scheduling star switching fabric pending transmission of those packets toward the transmission star switching fabric, wherein the intermediate buffer stage is operable to store packets to reduce missequencing of packets at outputs from the transmission star switching fabric.

2. (Original) The scheduler of Claim 1, wherein the scheduling star switching fabric comprises a signal divider operable to receive a multiple wavelength signal and to communicate the multiple wavelength signal to a plurality of output paths from the scheduling star switching fabric.

3. (Original) The scheduler of Claim 2, wherein the signal divider comprises a cascade of 1xn optical couplers.

4. (Original) The scheduler of Claim 2, wherein the signal divider comprises a power divider.

5. (Original) The scheduler of Claim 2, wherein the scheduling star switching fabric comprises a signal combiner operable to combine a plurality of wavelength signals into the multiple wavelength signal and to communicate the multiple wavelength signal to the signal divider.

6. (Original) The scheduler of Claim 2, wherein the signal divider is coupled to an optical amplifier operable to amplify the multiple wavelength signal to at least partially compensate for a loss associated with the signal divider.

7. (Original) The scheduler of Claim 1, wherein the plurality of selecting elements comprise a plurality of tunable filters, each operable to receive a substantially similar set of packets from the scheduling star switching fabric and to selectively pass packets having a selected wavelength.

8. (Original) The scheduler of Claim 7, wherein the plurality of tunable filters reside integrally to the scheduling star switching fabric.

9. (Original) The scheduler of Claim 1, wherein the plurality of selecting elements comprise a plurality of tunable optical transmitters, each operable to communicate to the scheduling star switching fabric a packet in an optical format comprising a selected wavelength.

10. (Original) The scheduler of Claim 9, wherein the plurality of selecting elements comprises a plurality of optical filters, each operable to receive a substantially similar set of packets from the scheduling star switching fabric and to pass toward the transmission star switching fabric packets having a particular wavelength.

11. (Original) The scheduler of Claim 1, further comprising a scheduling engine operable to generate control signals to instruct the plurality of selecting elements as to which wavelength to pass, wherein the scheduling engine communicates control signals to each of the plurality of selecting elements in a round robin fashion.

12. (Original) The scheduler of Claim 11, wherein the control signals received by any one of the plurality of selecting elements comprises an instruction operable to cause the selecting element to select a different wavelength than a last wavelength processed by that selecting element.

13. (Original) The scheduler of Claim 11, wherein the scheduling engine communicates transmission control signals to a plurality of transmission selecting elements associated with the transmission star switching fabric, wherein the transmission control signals instruct the plurality of transmission selecting elements to tune to a selected wavelength in a round robin fashion.

14. (Cancelled)

15. (Cancelled)

16. (Original) The scheduler of Claim 1, further comprising an input buffer stage operable to store packets pending transmission toward the scheduling star switching fabric.

17. (Previously Presented) A method of scheduling operation of a star switching fabric, comprising:

receiving at a scheduler a plurality of packets each having a wavelength;

communicating from a scheduling star switching fabric of the scheduler a plurality of substantially similar sets of the plurality of packets; and

selectively passing packets having selected wavelengths from the scheduling star switching fabric for receipt by a transmission star switching fabric, wherein packets received at the transmission star switching fabric over a given time period comprise a more uniform load distribution than packets received at an input to the scheduler over the same time period, and wherein selectively passing packets having selected wavelengths from the scheduling star switching fabric to the transmission star switching fabric comprises:

receiving at a tunable optical filter associated with the scheduling star switching fabric one of the substantially similar sets of the plurality of packets;

tuning the tunable optical filter to a selected wavelength;

passing from the tunable optical filter one of the plurality of packets having the selected wavelength; and

communicating in a round robin fashion a plurality of control signals each designated for a different one of the plurality of optical filters, wherein at least some of the control signals instruct the receiving tunable optical filter to tune to a different wavelength than the last wavelength processed by that filter.

18. (Original) The method of Claim 17, wherein each of the plurality of packets comprises a different wavelength.

19. (Original) The method of Claim 17, wherein selectively passing packets having selected wavelengths from the scheduling star switching fabric to the transmission star switching fabric comprises:

tuning one of a plurality of tunable optical transmitters to a selected wavelength;

generating a packet at the selected wavelength using the one of the plurality of tunable optical transmitters;

communicating the generated packet to the scheduling star switching fabric; and

receiving the generated packet at one of a plurality of filters associated with the scheduling star switching fabric, the one of the plurality of filters operable to pass the one of the selected wavelengths.

20. (Original) The method of Claim 19, further comprising:

communicating in a round robin fashion a plurality of control signals each designated for a different one of the plurality of tunable optical transmitters;

wherein at least one of the control signals instructs the receiving tunable optical transmitter to tune to a different wavelength than the last wavelength processed by that transmitter.

21. (Cancelled)

22. (Cancelled)

23. (Original) The method of Claim 21, wherein the tunable optical filter resides within the star switching fabric.

24. (Original) The method of Claim 21, wherein the tunable optical filter resides on a line card coupled to the star switching fabric.

25. (Original) The method of Claim 17, further comprising:

generating a plurality of transmission control signals, each operable to instruct one of a plurality of transmission selecting elements associated with the transmission star switching fabric to tune to a selected wavelength;

communicating the plurality of transmission control signals in a round robin fashion to the plurality of transmission selecting elements.

26. (Previously Presented) A network element operable to direct optical signals, the network element comprising:

a scheduler operable to receive in a given time period a plurality of packets each associated with a wavelength, the plurality of packets received comprising a first load distribution, wherein the scheduler comprises:

a scheduling star switching fabric operable to receive the plurality of packets and communicate a plurality of substantially similar sets of the plurality of packets received;

a plurality of scheduler selecting elements associated with the scheduling star switching fabric, each operable to contribute to selectively passing packets from the scheduling star switching fabric for receipt by a transmission star switching fabric; and

a scheduling engine operable to generate control signals to instruct the plurality of scheduler selecting elements as to which wavelength to pass, wherein the scheduling engine communicates control signals to each of the plurality of scheduler selecting elements in a round robin fashion; and

a transmission star switching fabric operable to receive the plurality of packets communicated from the scheduler and to communicate a plurality of substantially similar sets of the plurality of packets received to each of a plurality of tunable transmission filters, each tunable transmission filter operable to pass a particular packet toward an output link by tuning to a wavelength associated with that packet;

wherein the scheduler is operable to rearrange the order of packets communicated from the scheduler from the order those packets were received so that packets received by the transmission star switching fabric in the given time period comprise a more uniform load distribution than the first load distribution, and wherein the scheduler is operable to schedule tuning of the plurality of tunable transmission filters using a round robin algorithm.

27. (Cancelled)

28. (Previously Presented) The network element of Claim 26, wherein the scheduling star switching fabric comprises a signal divider operable to receive a multiple wavelength signal and to communicate the multiple wavelength signal to a plurality of output paths from the scheduling star switching fabric.

29. (Original) The network element of Claim 28, wherein the scheduling star switching fabric comprises a signal combiner operable to combine a plurality of wavelength signals into the multiple wavelength signal and to communicate the multiple wavelength signal to the signal divider.

30. (Original) The network element of Claim 28, wherein the signal divider is coupled to an optical amplifier operable to amplify the multiple wavelength signal to at least partially compensate for a loss associated with the signal divider.

31. (Previously Presented) The network element of Claim 26, wherein the plurality of scheduler selecting elements comprise a plurality of tunable filters, each operable to receive a substantially similar set of packets from the scheduling star switching fabric and to selectively pass packets having a selected wavelength toward the transmission star switching fabric.

32. (Previously Presented) The network element of Claim 26, wherein the plurality of selecting elements comprise a plurality of tunable scheduler transmitters, each operable to communicate to the scheduling star switching fabric a packet in an optical format comprising a selected wavelength.

33. (Original) The network element of Claim 32, wherein the plurality of scheduler selecting elements comprise a plurality of optical filters, each operable to receive a substantially similar set of packets from the scheduling star switching fabric and to pass toward the transmission star switching fabric packets having a particular wavelength.

34. (Cancelled)

35. (Previously Presented) The network element of Claim 26, wherein the control signals received by any one of the plurality of scheduler selecting elements comprises an instruction operable to cause the scheduler selecting element to select a different wavelength than a last wavelength processed by that scheduler selecting element.

36. (Previously Presented) The network element of Claim 26, wherein the scheduling engine communicates transmission control signals to the plurality of tunable transmission filters, wherein the transmission control signals instruct the plurality of tunable transmission filters to tune to a selected wavelength in a round robin fashion.

37. (Original) A network element operable to direct optical signals, the network element comprising:

a scheduler operable to receive in a given time period a plurality of optical packets associated with a wavelength, the plurality of packets received comprising a first load distribution;

a plurality of tunable optical transmitters each operable to receive a packet from the scheduler and to communicate the packet in an optical format having a selected wavelength; and

a transmission star switching fabric operable to receive a plurality of packets from the plurality of tunable optical transmitters and to communicate a plurality of substantially similar sets of the plurality of packets received to each of a plurality of transmission filters each operable to pass a packet having a particular wavelength toward an output link associated with that filter;

wherein the scheduler is operable to rearrange the order of packets communicated from the scheduler from the order those packets were received so that packets received by the transmission star switching fabric in the given time period comprise a more uniform load distribution than the first load distribution, and wherein the scheduler is operable to schedule tuning of the plurality of tunable optical transmitters using a round robin algorithm.

38. (Original) The network element of Claim 37, wherein the scheduler comprises:

a scheduling star switching fabric operable to receive the plurality of packets and communicate a plurality of substantially similar sets of the plurality of packets received; and

a plurality of scheduler selecting elements associated with the scheduling star switching fabric, each operable to contribute to selectively passing packets from the scheduling star switching fabric for receipt by a transmission star switching fabric.

39. (Original) The network element of Claim 38, wherein the plurality of scheduler selecting elements comprise a plurality of tunable filters, each operable to receive a substantially similar set of packets from the scheduling star switching fabric and to selectively pass packets having a selected wavelength toward the transmission star switching fabric.

40. (Previously Presented) The network element of Claim 38, wherein the plurality of scheduler selecting elements comprise a plurality of tunable scheduler transmitters, each operable to communicate to the scheduling star switching fabric a packet in an optical format comprising a selected wavelength.

41. (Original) The network element of Claim 40, wherein the plurality of scheduler selecting elements comprise a plurality of optical filters, each operable to receive a substantially similar set of packets from the scheduling star switching fabric and to pass toward the transmission star switching fabric packets having a particular wavelength.

42. (Original) The network element of Claim 38, wherein the scheduler comprises a scheduling engine operable to generate control signals to instruct the plurality of scheduler selecting elements as to which wavelength to pass, wherein the scheduling engine communicates control signals to each of the plurality of scheduler selecting elements in a round robin fashion.

43. (Original) The network element of Claim 42, wherein the control signals received by any one of the plurality of scheduler selecting elements comprises an instruction operable to cause the scheduler selecting element to select a different wavelength than a last wavelength processed by that scheduler selecting element.

44. (Original) The network element of Claim 42, wherein the scheduling engine communicates transmission control signals to the plurality of tunable optical transmitters associated with the transmission star switching fabric, wherein the transmission control signals instruct the plurality of tunable optical transmitters to tune to a selected wavelength in a round robin fashion.

45. (Cancelled)

46. (Cancelled)

47. (Cancelled)

48. (Cancelled)

49. (Cancelled)

50. (Previously Presented) A method of scheduling operation of a star switching fabric, comprising:

receiving at a scheduler a plurality of packets each having a wavelength;

communicating from a scheduling star switching fabric of the scheduler a plurality of substantially similar sets of the plurality of packets; and

selectively passing packets having selected wavelengths from the scheduling star switching fabric for receipt by a transmission star switching fabric, wherein packets received at the transmission star switching fabric over a given time period comprise a more uniform load distribution than packets received at an input to the scheduler over the same time period, and wherein selectively passing packets having selected wavelengths from the scheduling star switching fabric to the transmission star switching fabric comprises:

tuning one of a plurality of tunable optical transmitters to a selected wavelength;

generating a packet at the selected wavelength using the one of the plurality of tunable optical transmitters;

communicating the generated packet to the scheduling star switching fabric;

receiving the generated packet at one of a plurality of filters associated with the scheduling star switching fabric, the one of the plurality of filters operable to pass the one of the selected wavelengths; and

communicating in a round robin fashion a plurality of control signals each designated for a different one of the plurality of tunable optical transmitters, wherein at least one of the control signals instructs the receiving tunable optical transmitter to tune to a different wavelength than the last wavelength processed by that transmitter.

51. (Cancelled)

52. (Cancelled)

53. (Cancelled)

54. (Cancelled)

55. (Cancelled)

REMARKS

Applicants thank Examiner Li for the telephone conference on June 19, 2006 and for his thoughtful consideration of this case. This Application has been carefully reviewed in light of the Examiner's Interview Summary and Supplemental Notice of Allowance mailed June 26, 2006. Applicant appreciates the Examiner's allowance of Claims 1-13, 16-20, 23-26, 28-33, 36-44, and 50. Applicant respectfully requests reconsideration, further examination, and favorable action in this case.

Interview Summary

Applicant's attorney conducted a telephonic conference with Examiner Li on June 19, 2006. Pursuant to M.P.E.P. §713.04, Applicant submit this summary of the telephonic interview to record Applicant's understanding of the substance of the interview. If Applicant's understanding is inaccurate, notice of such is appreciated.

During the interview, Applicant and the Examiner discussed independent Claim 50. Applicant understands that the Examiner agreed that independent Claim 50 is in a condition of allowance.

CONCLUSION

Applicant has made an earnest attempt to place this case in condition for allowance. For the foregoing reasons and for other reasons clearly apparent, Applicant respectfully requests reconsideration and full allowance of all pending Claims.

Applicant believes that no fee is due. However, the Commissioner is hereby authorized to charge any fee or credit any overpayment to Deposit Account No. 02-0384 of Baker Botts L.L.P.

If the Examiner feels that a conference would advance prosecution of this Application in any manner, Brian J. Gaffney stands willing to conduct such a telephone interview at the convenience of the Examiner. Mr. Gaffney may be reached at 214-953-6682.

Respectfully submitted,
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Date: July 14, 2006

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